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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/489,514
Filing Date: January 21, 2000
Appellant(s): NARAYANAN ET AL.

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Scott C. Harris
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 27, 2006 appealing from the Office action mailed May 25, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

A statement identifying by name the real party in interest is contained in the brief.

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

Summaries of claimed subject matter are submitted for claim 19, claim 26 and claim 27.

For claims 7, 13, the summary of claimed subject matter contained in the brief is correct.

For claim 18, the summary of claimed subject matter contained in the brief is deemed deficient. for the following reasons:

Claim 18 is summarized as a claim which "defines providing a catalyst ink...", "applying a catalyst ink..." and "bonding the membrane to at least one electrode...." The summary for

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claim 18 is silent on the claimed “using said membrane as a cathode of a direct methanol fuel cell” as stated in the last line of the claim. The examiner emphasizes the inclusion of the last gerund “using...” in the claim summary, as its recitation amongst the other gerunds “providing”, “applying” and “bonding” is pertinent towards the 35 U.S.C. 101 and 35 U.S.C. 112, second paragraph rejections.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant’s statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,677,074	SERPICO et al.	10-1997
5,411,641	TRAINHAM et al.	5-1995
5,992,008	KINDLER	11-1999
4,524,114	SAMUELS et al.	6-1985

Dupont Zonyl® Ink and Coating Guide, 1997, pp. 1-4, available online at:

http://www2.dupont.com/Teflon_Industrial/en_US/assets/downloads/h07812.pdf¹

Dupont Teflon® PTFE 30B Product Information, 1999, pp. 1-14, available online at:

http://www2.dupont.com/Teflon_Industrial/en_US/assets/downloads/h03236.pdf²

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(9) Grounds of Rejection

Claim 18 is rejected under 35 U.S.C. 101.

Claim 18 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 18 has been amended to recite in the preamble “A process comprising:...” The body of the claim maintains the prior “providing...”, “applying...” and “bonding...” steps while also adding a step directed to “using said membrane...” As such, the claim is directed to a combination of a “process of making” and a “process of using,” entities which exist in two different statutory classes of invention. The claim is rejected under 35 U.S.C. 101 based on the theory that the claim is directed to neither a “process of making” nor a “process of using,” but rather embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only.

Claim 18 is rejected under 35 U.S.C. 112, second paragraph.

For the reasons set forth above under 35 U.S.C. § 101 (discussion above), claim 18 is directed to a combination of a process of making and a process of using. Thus, the statutory type of invention (and hence the claimed scope) is indefinite; as a result of the combination of two separate statutory classes of invention a manufacturer or seller would not know the metes and bounds of the claim.

¹ The examiner notes that an earlier version of this reference is attached as pp. 10-13 of the Examiner's Answer filed on February 25, 2003.

² The examiner notes that an earlier version of this reference is attached as pp. 14-17 of the Examiner's Answer filed on February 25, 2003.

It is noted that appellant appears to refer to the claim in singular, as in “the process” (pg. 8). While the preamble indeed recites “A process”, that a single process is being claimed while two different process limitations are present in the body of the claim is the very basis for the ambiguity in the claim, i.e. is “the process” a process of making, per the recited “providing...”, “applying...” and “bonding...”, or, is “the process” a process of using, per the recited “using said membrane...” ?

Claims 7-10, 13, 14, 18, 20 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. in view of the Dupont Zonyl reference and Trainham III et al. (U.S. Pat. 5,411,641)

Serpico et al. teaches a process for making a catalyst ink for a fuel cell comprising mixing at room temperature water and particles of a fluorocarbon polymer with a particle size of 0.05 microns to 500 microns. (col. 2 line 42-43) The catalytic material comprises Pt, *inter alia*. (col. 4 line 19) The fluoropolymers comprise polytetrafluoroethylene, *inter alia*. (col. 4 line 48) The catalyst ink also includes an ionomer. (col. 3 line 58 et seq.) The catalyst ink, once applied to a membrane, is bonded to an electrode. (col. 6 line 50 et seq.) In Example I, Serpico et al. teaches that “[t]he mixture was stirred with moderate agitation to form a viscous particle dispersion...”, and upon addition of the fluoropolymer (PTFE), “[t]he dual particle suspension was stirred slowly until homogenous.”

While Serpico et al. discloses a particle size range of 0.05 microns to 500 microns, it is worth noting that in Example 1 of the patentees’ disclosure and the subsequent example thereto, the PTFE dispersion is specifically referenced as Dupont Teflon 30B. (col. 6 line 35) Dupont

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Teflon 30B has been established throughout the prosecution of this application to have a particle size of 0.05 microns to 0.5 microns. (col. 6 line 35, see Dupont Teflon PTFE 30B Product Information Guide, of record) Notwithstanding the smaller particle size for the PTFE fluoroadditive albeit at 0.5 micron in size, while Serpico et al. does not explicitly teach a particle size of 1 to 4 microns, the Dupont Zonyl reference teaches PTFE fluoroadditives polymers wherein the particle size thereof is a result-effective variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) In the Dupont Zonyl reference, the size of the PTFE fluoroadditives are shown to be result-effective as the size of the particles directly affects dispersion stability of the fluoroadditive formulation. (pg. 1 under "Ink and OPV Product Recommendations") Ultimately, the dispersion stability affects the wear agent performance, i.e. durability of the fluoroadditive on its substrate.

As to the property of improving ion conduction, while Serpico et al. does not explicitly teach an ionomer, Trainham et al. teaches addition of a sulfonated fluoroionomer such as Nation to catalyst inks. See col. 8 line 9 et seq. Thus, the skilled artisan would find obvious to employ a Nafion ionomer in Serpico et al.'s invention in order to "enhance the catalyst-ionomer surface contact and to act as a binder to the Nation[®] membrane sheet." (ib.)

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. in view of Dupont Zonyl reference and Trainham III et al., and further in view of Kindler.

The teachings of Serpico and the Dupont Zonyl reference are discussed above.

Serpico does not explicitly teach a second ionomer comprising a liquid copolymer of tetrafluoroethylene and perfluorovinylethersulfonic acid. However, Kindler teaches such a liquid

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copolymer. (col. 3 lines 36-38, col. 6 line 28 *et seq*) Thus, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a liquid copolymer of tetrafluoroethylene and perfluorovinylethersulfonic acid for reasons such as enhancing ionic conduction within the electrode.

Claims 15-17, 19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serpico et al. in view of the Dupont Zonyl reference and Trainham III et al., and further in view of Samuels et al.

The teachings of Serpico and the Dupont Zonyl reference are discussed above.

Serpico does not explicitly teach roughening the surface of the membrane prior to applying the catalyst ink. However, Samuels et al. teaches roughening the surface of the membrane using silicon carbide prior to catalyst deposition. See col. 7 line 33 as follows:

...before the catalyst is deposited upon the surface of the solid polymer electrolyte, the surface is treated by a suitable abrading or roughening means which contacts the surface of the solid polymer electrolyte base member in at least two directions. In a preferred mode, the solid polymer electrolyte membrane is abraded with a silicon carbide sheet to provide the desired roughness. The catalyst is deposited upon the roughened or abraded surface and fixed thereto by suitable means, e.g., pressure and/or heat. By this method, substantially reduced loadings of catalysts are possible.

Thus, at the time the invention was made, it would have been obvious to the skilled artisan to employ roughening of the membrane for reasons such as increasing its surface area, thereby enhancing surface sites for catalyst ink adhesion.

(10) Response to Argument

Response to the 35 U.S.C. 101 rejection of claim 18:

Appellant's arguments have been fully considered, however they are not found persuasive for the following reasons:

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Appellant submits that the Office's contention that a permissible claim can only contemplate one class is legally incorrect. The Office's contention is said to contradict the intention of Congress to allow for classes of patentability to have a broad scope so that all inventive works of mankind are covered and not just those within a specified category. This argument is not persuasive. Indeed, Congress allows for a broad scope of patentable inventions by permitting claims drawn to a process, machine, manufacture or composition of matter. However, this broad scope allows for discrete types *among* mutually exclusive types of subject matter, while in the instant case the issue is more precisely conflicting limitations drawn from two statutory types of claims *within* the same claim. The examiner asserts that process claims are further defined into two types: 1) process of making or manufacture and 2) process of using. Appellant's claim is neither of these two types of process claims, as the claim merely recites in its preamble "[a] process comprising...." Ordinarily, if all the gerund limitations were drawn to only one of the two process types, then the claim that recites "A process..." in its preamble can be reasonably understood to be a process claim corresponding to the type specified by the gerund limitations. In appellant's claim, however, the gerund limitation "using..." which was amended into the claim on November 23, 2005, contradicts the prior gerund recitation of "providing...", "applying..." and "bonding...." As a result, the preamble recitation of a process essentially encompasses both types of process claims. While it is clear that claim 18 is drawn to a process, the scope of the claim insofar as what statutory type of process, i.e. a use or manufacture, cannot be ascertained. Finally, and as a matter of observation, even appellant's own summary of the claimed subject matter for claim 18 is completely silent as to what type of statutory claim is

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sought, and instead summarizes the claim without mention of its preamble recitation or statutory type of claim. See the Appeal Brief on page 2, last paragraph bridging into page 3.

Response to the 35 U.S.C. § 112 rejection of claim 18:

Appellant's arguments have been fully considered, however they are not found persuasive for the following reasons:

Appellant asserts that the claimed scope of claim 18 is clear from the recited steps and appears to state that the claim is intended as a combination of plural processes. In the examiner's view, therein lies the issue of indefiniteness. Claim 18 is drafted in such a way that a single process appears to be the scope of protection sought, i.e. "A process comprising...", while two different types of process limitations are present in the body of the claim. The prior Office action set forth the following lines of inquiry: Is the claimed "A process" a process of making or manufacture, per the recited "providing...", "applying..." and "bonding..." steps, or, is the claimed "A process" a process of using, per the recited "using said membrane..."? By appellant's own admission that the claim is a *combination*, it appears to the examiner that the claim is *neither* a process of making or manufacture nor a process of making. Thus, the statutory type of invention is indefinite.

Response to the 35 U.S.C. § 103(a) arguments for the rejection of claims 7-10, 13, 14, 18, 20 and 23-26 based on Serpico et al., the Dupont Zonyl reference and Trainham III et al.

Appellant's arguments have been fully considered, however they are not found persuasive for the following reasons:

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Appellant's arguments have been fully considered, however they are not found persuasive. Appellant submits that Trainham III et al. teaches adding Nafion only as a binder and that there is no teaching that the Nafion ionomer would have the claimed property of improving ion conduction. (emphasis as submitted) In reply, the fact that appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Notwithstanding another purpose for which Trainham III et al. arguably employs Nafion, the Nafion is nonetheless added as part of the catalyst ink mixture. Furthermore, the Nafion ionomer disclosed by the prior art is *the exact same material* disclosed and claimed by appellant, thus, it would naturally flow to have the same property of improving ion conduction. As to there being no teaching or suggestion for preparing a substrate of carbon paper, as required by claim 13, see col. 6 lines 44-46 of Trainham III et al., which discloses that the Nafion fluoroionomer, i.e. fluorocarbon polymer is specifically disclosed as being supported on fluorocarbon fabric, to wit, "[t]he other two types of NAFION® are both supported on a fluorocarbon fabric...."

Response to the 35 U.S.C. 103(a) arguments for the rejection of claim 12 based on Serpico et al., the Dupont Zonyl reference, Trainham III et al., and Kindler.

The examiner notes that no salient arguments are submitted for the rejection of claim 12 under 35 U.S.C. 103(a) based on Serpico et al., the Dupont Zonyl reference, Trainham III et al., and Kindler. At best, the only argument submitted is that the claim under this ground of

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rejection is allowable by virtue of its dependency from another claim. Thus, the rejection is maintained for the reasons of record.

Response to the 35 U.S.C. 103(a) arguments for the rejection of claims 15-17, 19, 21 and 22 based on Serpico et al., the Dupont Zonyl reference, Trainham III et al. and Samuels et al.


The examiner notes that no salient arguments are submitted for the rejection of claims 15-17, 19, 21 and 22 under 35 U.S.C. 103(a) based on Serpico et al., the Dupont Zonyl reference, Trainham III et al., and Samuels et al. At best, the only argument submitted is that the claims under this ground of rejection are allowable by virtue of their dependency from another claim. Thus, the rejection is maintained for the reasons of record.

(11) Related Proceeding(s) Appendix


No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,


Julian Mercado
March 5, 2007

Conferees:

Patrick Ryan 

William Krynski 